

[175]

SEAT No. _____

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Sardar Patel University

M.Sc. (Sem-III), PS03EMTH21, Mathematics Education-I;

Friday, 29th March, 2019; 02.00 p.m. to 05.00 p.m.

Maximum Marks: 70

Note: (i) Notations and terminologies are standard; (ii) Figures to the right indicate marks.

Q.1 Answer the following.

[8]

1. Who is known as a founder of zero ?
(A) Aryabhata (B) Brahmagupta
(C) Ramanujan (D) none of these
2. Which of the following number system has base 60 ?
(A) Egyptian (B) Hindu-Arabic
(C) Babylonians (D) none of these
3. The value of Golden ratio is the solution of equation
(A) $x^2 = x - 1$ (B) $x^2 = x + 1$ (C) $x^2 + x = 2$ (D) none of these
4. Which one is not perfect number ?
(A) 6 (B) 28 (C) 32 (D) none of these
5. Which one from the following is a group ?
(A) $(\mathbb{N}, +)$ (B) $(2\mathbb{N}, -)$ (C) $(\mathbb{N} \cup \{0\}, +)$ (D) none of these
6. 'Siddhanta Shiromani' written by
(A) Aryabhata (B) Brahmagupta
(C) Bhaskaracharya (D) Ramanujan
7. Euler's formula for planer graph is
(A) $V + E = F + 2$ (B) $V - E = 2 - F$
(C) $V - E = F - 2$ (D) none of these
8. The number of faces in octahedron is
(A) 12 (B) 6 (C) 8 (D) 20

Q.2 Attempt any seven:

[14]

- (a) Show that prime numbers are infinite.
- (b) If $(45)_6 + (54)_6 = (x)_6$ then find x .
- (c) Define Fibonacci sequence.
- (d) What is Waring's conjecture ?
- (e) The 3rd and 6th term in arithmetic progression are 8 and 20 respectively. Find 10th term of it.
- (f) State Fermat's last theorem.
- (g) Find $\sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}$.
- (h) Give postulates of Euclidean geometry.
- (i) What are three problems of antiquity ?

(P.T.O.)

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Q.3

- (a) Write any one biography from the following: [6]
(i) Aryabhata (ii) Brahmagupta
(b) Discuss different periods of development of mathematics. [6]

OR

- (b) Discuss history of arithmetic.

Q.4

- (a) Discuss Ramanujan's contributions in number theory. [6]
(b) Discuss (i) Goldbach's conjecture (ii) Pigeonhole principle [6]

OR

- (b) Let (a, b, c) be Pythagorean triplet with $a^2 + b^2 = c^2$ and P be a perimeter of Pythagorean triangle. Show that $P|ab$.

Q.5

- (a) Write any one biography from the following: [6]
(i) Abel (ii) Galois
(b) Discuss contributions of Lagrange and Cauchy in the development modern algebra. [6]

OR

- (b) Let $60^a = 3$ and $60^b = 5$. Find $12^{\frac{1-a-b}{2(1-b)}}$.

Q.6

- (a) Discuss the relation of geometry with arithmetic and algebra. [6]
(b) Discuss Euler's problem of 36 soldiers. [6]

OR

- (b) Discuss the contribution of Janos Bolyai in non Euclidean geometry.

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(2)